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CLAIMS

1. A method of selectively providing cardiac pacing with an implantable medical device comprising:
 setting a flag during a given cardiac cycle in response to ventricular activity; and
 precluding a ventricular pacing pulse during a current cardiac cycle if the flag is present at the onset of the current cardiac cycle.
2. The method of claim 1, wherein the flag is valid only for a cardiac cycle immediately succeeding the given cycle.
3. The method of claim 1, wherein the flag is valid only for one cardiac cycle subsequent to the given cardiac cycle.
4. The method of claim 1, wherein the given cardiac cycle is defined by an A-A interval.
5. The method of claim 4, wherein the ventricular activity may occur at any time during the A-A interval to set the flag.
6. The method of claim 1, further comprising initiating an atrial escape interval at a start of the current cardiac cycle if the flag is present at the onset of the current cardiac cycle.
7. The method of claim 6, further comprising:
 delivering an atrial pacing pulse at the initiation of the atrial escape interval.

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8. The method of claim 7, wherein an intrinsic atrial depolarization initiates the atrial escape interval.
9. The method of claim 8, wherein a scheduled atrial pacing pulse is inhibited.
10. The method of claim 1, further comprising:
 - initiating an AV interval if, at the onset of the current cardiac cycle, the flag is absent;
 - delivering a ventricular pacing pulse at the expiration of the AV interval;
 - setting the flag for a subsequent cardiac cycle; and
 - initiating a VA interval with the delivered ventricular pace.
11. The method of claim 10, further comprising:
 - restarting the VA interval if ventricular activity is sensed during the VA interval.
12. The method of claim 10, further comprising:
 - mode switching to a dual chamber mode for at least one cardiac cycle subsequent to delivering the ventricular pacing pulse.
13. The method of claim 10, further comprising:
 - monitoring ventricular pacing over a plurality of cardiac cycles with a mode supervisor; and
 - mode-switching to a dual chamber mode under the direction of the mode supervisor if the mode supervisor identifies a predetermined pattern of ventricular pacing.
14. The method of claim 13, wherein the predetermined pattern is if X of the previous Y cardiac cycles includes a ventricular pacing pulse.

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15. The method of claim 10, further comprising:
monitoring a plurality of cardiac cycles with a mode supervisor and
identifying cardiac cycles devoid of ventricular activity; and
mode-switching to a dual chamber mode under the direction of the mode supervisor if the mode supervisor identifies a predetermined pattern of cardiac cycles devoid of ventricular activity.
16. The method of claim 15, wherein the mode supervisor directs the mode switch unless X or more of the previous Y cardiac cycles includes ventricular activity.
17. The method of claim 16, wherein X=3 and Y=4.
18. An implantable medical device comprising:
means for sensing cardiac depolarizations;
means for pacing; and
means for controlling the means for pacing according to a selected mode, wherein one selectable mode is a fully inhibited DDI (FIDDI) mode.
19. The implantable medical device of claim 18, further comprising mode supervising means.
20. The implantable medical device of claim 18, further comprising:
means for implementing the FIDDI mode to conduct facilitated atrial pacing threshold testing.
21. The implantable medical device of claim 18, further comprising:
means for mode switching from the FIDDI mode to another mode when intrinsic conduction is insufficient.

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22. The implantable medical device of claim 21, wherein intrinsic conduction is insufficient if FIDDI delivers a ventricular pacing pulse.

23. The implantable medical device of claim 21, further comprising mode supervising means that monitor ventricular activity over a plurality of cardiac cycles and determine when intrinsic conduction is insufficient based on a predetermined pattern of monitored cardiac cycles that lack ventricular activity.

24. An implantable medical device comprising:
means for sensing cardiac depolarizations;
means for pacing according to a selectable mode;
means for mode switching to an atrial based pacing mode upon the sensing of ventricular activity in a given cardiac cycle; and
means for mode switching from the atrial based pacing mode to a dual chamber mode at the completion of the given cardiac cycle, wherein the dual chamber mode includes a first set of parameters that are implemented for a first cardiac cycle while operating in the dual chamber mode such that the implemented parameters preclude the delivery of a ventricular pacing pulse during the first cardiac cycle and a second set of parameters implemented in a second consecutive cardiac cycle while operating in the dual chamber mode such that ventricular pacing is delivered unless inhibited.

25. The implantable medical device of claim 24, wherein the first set of parameters include setting an AV interval to a duration equal to an A-A interval.

26. An implantable medical device comprising:
a controller;
a ventricular lead operably coupled to the controller and configured to deliver ventricular pacing pulses and sense ventricular depolarizations;

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an atrial lead operable coupled to the controller and configured to deliver atrial pacing pulses and sense atrial depolarizations; and

a memory including a plurality of algorithms defining pacing modalities selectable by the controller, wherein one of the pacing modalities is fully inhibited DDI.

27. A computer readable medium including instructions that define a pacing mode that when implemented on an implantable medical device cause the implantable medical device to:

set a flag in response to ventricular activity occurring in a current cardiac cycle, wherein the flag is valid for a subsequent cardiac cycle;

determine if a flag is present at the start of a given cardiac cycle;

initiate an atrial escape interval if the flag is present at the start of the given cardiac cycle;

initiate an AV interval if no flag is present at the start of the given cardiac cycle;

deliver a ventricular pacing pulse at the completion of the AV interval; and
initiate a VA interval at the completion of the AV interval.

28. The computer readable medium of claim 27, wherein the ventricular activity includes a ventricular pace or intrinsic ventricular depolarization.

29. The computer readable medium of claim 27, wherein the AV interval is 80 ms.

30. The computer readable medium of claim 27, wherein no ventricular pace is delivered during the atrial escape interval.

31. The computer readable medium of claim 27, wherein sensed ventricular activity occurring during the VA interval will restart the VA interval.

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32. The computer readable medium of claim 27, wherein a second ventricular sense during the given cardiac cycle will terminate the atrial escape interval and initiate a VA interval.

33. The computer readable medium of claim 32, wherein a third or subsequent ventricular sense during the given cardiac cycle will restart the VA interval.

34. The computer readable medium of claim 27, wherein a first atrial sense or a first ventricular sense will inhibit a scheduled pacing pulse and initiate the subsequent interval.

35. The computer readable medium of claim 27, further comprising instructions to cause the implantable medical device to:
mode switch to a dual chamber mode for at least one cardiac cycle immediately subsequent to the cardiac cycle in which the ventricular pacing pulse was delivered.

36. The computer readable medium of claim 27, further comprising instructions to cause the implantable medical device to:
monitor a plurality of cardiac cycles;
identify cardiac cycles devoid of ventricular activity; and
mode-switch to a dual chamber mode if a predetermined pattern of cardiac cycles devoid of ventricular activity is identified.

37. The computer readable medium of claim 36, wherein the predetermined pattern is a predetermined number of cardiac cycles devoid of ventricular activity out of a consecutive series of previous cardiac cycles.

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38. The computer readable medium of claim 27, further comprising instructions to cause the implantable medical device to operate a mode supervisor to monitor ventricular activity and selectively initiate mode switching.

39. A method of operating an implantable medical device in a mode, the method comprising:

setting a flag during a first cardiac cycle if a pre-established criteria is met during the first cardiac cycle;

determining whether the flag has been set at the initiation of a second cardiac cycle that is consecutive to the first cardiac cycle;

acting in a first manner during the second cardiac cycle and while remaining in the mode if the flag has been set;

acting in a second manner during the second cardiac cycle and while remaining in the mode if the flag has not been set.

40. The method of claim 39, wherein setting the flag includes placing information in a memory.

41. The method of claim 39, wherein setting the flag includes removing information from a memory.

42. The method of claim 39, wherein the flag is valid only for the second cardiac cycle.

43. The method of claim 39, wherein the pre-established criteria is the presence of ventricular activity.

44. The method of claim 43, wherein the ventricular activity includes ventricular pacing or sensed intrinsic depolarization.

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45. The method of claim 39, wherein acting in the first manner includes initiating an atrial escape interval.
46. The method of claim 45, wherein ventricular pacing is precluded during the atrial escape interval.
47. The method of claim 39, wherein acting in the second manner includes:
initiating an AV interval;
delivering a ventricular pacing pulse at the expiration of the AV interval;
and
initiating a VA interval.
48. The method of claim 47, further comprising:
setting a second flag during the second cardiac cycle in response to the ventricular pacing pulse, wherein the second flag is only valid for a third cardiac cycle that is consecutive to the second cardiac cycle.
49. The method of claim 39, further comprising:
monitoring a plurality of cardiac cycles while in the mode;
triggering a mode switch if the pre-established criteria is absent in more than one cardiac cycle out of a predetermined number of consecutive cardiac cycles.
50. An implantable medical device (IMD) having mode-switching capability for delivering pacing therapy in a selected mode, comprising:
an atrial lead;
a ventricular lead;
a memory;
a processing module in electronic communication with the ventricular lead

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and the memory wherein the processing module sets a flag in the memory during a first cardiac cycle if a pre-established criteria is sensed or delivered via the ventricular lead during the first cardiac cycle and determines whether the flag has been set at the initiation of a second cardiac cycle that is consecutive to the first cardiac cycle; and

a controller that initiates an atrial escape interval and precludes ventricular pacing during the second cardiac cycle and while remaining in the selected mode if the flag has been set and the controller initiates an AV interval and a ventricular pacing pulse during the second cardiac cycle and while remaining in the selected mode if the flag has not been set.

The method of claim 49, wherein the flag is valid only for the second cardiac cycle.

51. The IMD of claim 50, further comprising a mode supervisor module that monitors a plurality of cardiac cycles while in the selected mode and initiates a mode switch if a recurrence of cardiac cycles devoid of ventricular activity reaches a predetermined threshold.

52. The IMD of claim 51, wherein the recurrence is with respect to consecutive cardiac cycles proximal in time.

53. A method of operating an implantable medical device for delivering pacing therapy in a given mode, the method comprising:

initiating an atrial escape interval to start a cardiac cycle;

monitoring for intrinsic ventricular activity during the entirety of the atrial escape interval;

setting a flag if a first occurrence of ventricular activity is sensed during the atrial escape interval;

terminating the atrial escape interval and initiating a VA interval if a second occurrence of ventricular activity is sensed during the atrial escape

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interval and restarting the VA interval with each subsequent occurrence of ventricular activity sensed during the VA interval;

identifying an end of the cardiac cycle, wherein the end is defined by either an expiration of the atrial escape interval, an expiration of the VA interval, or a sensed atrial event;

delivering an atrial pacing pulse at the end of the cycle unless inhibited by the sensed atrial event;

determining whether the flag is present at the end of the cardiac cycle;

returning to step a if the flag is present at the end of the cardiac cycle;

initiating an AV interval if the flag is not present at the end of the current cardiac cycle;

delivering a ventricular pacing pulse at the completion of the AV interval, unless inhibited;

setting another flag;

initiating a VA interval;

restarting the VA interval if ventricular activity is sensed;

returning to step a upon completion of the VA interval, wherein completion of the VA interval includes either expiration of the VA interval or sensing an intrinsic atrial event.

54. A method of selectively providing cardiac pacing with an implantable medical device comprising:

setting a flag during a given cardiac cycle in response to ventricular activity; and

delivering a ventricular pacing pulse during a current cardiac cycle only if a flag is absent at the onset of the current cardiac cycle.